

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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FEDERAL COMMUNICATIONS
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In the Matter of)

Price Cap Performance Review)
for Local Exchange Carriers)

CC Docket No. 94-1

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GTE's COMMENTS

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domestic telephone operating companies

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TABLE OF CONTENTS

I.	THE COMMISSION NOW HAS AVAILABLE A LEC INPUT INFLATION INDEX AND AN ACCURATE MEASURE OF LEC TFP.....	6
II.	THE THEORETICALLY ACCURATE MEASURE OF THE PCI ADJUSTMENT IS THE GROWTH OF THE LEC INPUT PRICE MINUS THE RATE OF LEC TFP GROWTH. (Issue 1i)	8
	A. A return to first principles -- a direct measure -- is called for given that a LEC input price index exists.	8
	B. Economic analysis demonstrates that the input inflation differential is zero.	11
	C. Incorporating an input price differential is inconsistent with emulating competition and will cause unnecessary pricing instability.....	14
III.	TFP SHOULD BE BASED ON CERTAIN CRITERIA.	15
	A. The Christensen method is the most reasonable method to develop output price indexes for TFP calculation purposes. (Issue 1a).....	15
	B. The most appropriate measure of the cost of capital for a TFP study incorporates both debt and equity components. (Issue 1b)	16
	C. Economic depreciation rates are the relevant rates for TFP. (Issue 1c)	17
	D. The perpetual inventory method is a reasonable method to estimate capital stock just as the use of capital stock is a reasonable representation of capital services. (Issues 1d and 1e).....	18
	E. Christensen's method of converting capital stock into capital cost is based on economic theory. (Issue 1f)	19
	F. Labor should not be further decomposed, and the GDPPI remains a valid approximation of a material price index. (Issues 1g and 1h).....	20
	G. TFP should be based on TOTAL company productivity. (Issue 1j)	21
	H. Other firms should not be included in the TFP calculation. (Issue 1m)	23
	I. Universal Service and other subsidy programs do not require an adjustment to the TFP calculation. (Issue 1l)	25
IV.	GTE WOULD SUPPORT A PCI ADJUSTMENT FACTOR BASED ON A FIVE-YEAR ROLLING AVERAGE, BUT RECOMMENDS IT BE FORMALLY FORECAST. (Issues 3a, 3b, 3c, 3d)	25
	A. GTE suggests a formal prediction of the price change in place of a five-year moving average.	28

TABLE OF CONTENTS

B.	For a formal prediction process, GTE suggests an ARIMA forecasting method for forecasting the PCI adjustment factor.....	28
V.	The Historical Revenue Method is not an appropriate measure of productivity for the price cap formula since it represents precisely what price caps was designed to avoid. (Issue 2a)	31
VI.	The Historical Price Method is not superior to the Christensen TFP approach. (Issue 2b).....	33
VII.	THE PCI ADJUSTMENT FACTOR SHOULD NOT INCLUDE A CONSUMER PRODUCTIVITY DIVIDEND. (Issue 2c).....	35
VIII.	A SINGLE PCI ADJUSTMENT FACTOR SHOULD BE ESTABLISHED WITHOUT SHARING. (Issues 4 and 5)	37
IX.	THE COMMISSION SHOULD ELIMINATE THE SEPARATE COMMON LINE FORMULA. (Issues 6a and 6c)	41
X.	EXOGENOUS COSTS NOT INCLUDED IN THE PCI ADJUSTMENT FACTOR SHOULD STILL BE ALLOWED. (Issues 7a and 7b).....	43
XI.	THE TIMING OF A PERFORMANCE REVIEW IS DEPENDENT ON THE RULES ESTABLISHED BY THE COMMISSION IN THIS PROCEEDING. (Issue 8).....	44
APPENDIX A	The appropriate measure for a PCI adjustment factor is the growth of LEC input prices minus the rate of growth of LEC TFP.	
APPENDIX B	The existing price cap formula is only economically valid if no adjustment is made for the W-Factor.	
APPENDIX C	Properly done, incorporating a W-Factor reverts to GTE's proposed method, but with unnecessary complications that allow the possibility of gaming.	
APPENDIX D	ARIMA forecasts provide the best way of determining a PCI adjustment factor on a going-forward basis that is consistent with mimicking competition.	
APPENDIX E	GTE's analysis of the Direct Method.	
APPENDIX F	GTE California Incorporated Testimony and Reply Testimony of Dr. Gregory M. Duncan.	

SUMMARY

GTE recommends that the Commission return to "first principles" and structure the price cap formula so that it contains a direct measure of changes in unit cost for Local Exchange Carriers ("LECs" or "exchange carriers") and LEC Total Factor Productivity ("TFP"). The formula recommended by GTE is the growth of the LEC input price minus the rate of LEC TFP growth adjusted for exogenous costs -- which is the theoretically accurate measure of the Price Cap Index adjustment. This formula eliminates all economy-wide data from the price cap formula and concentrates purely on the price cap LECs. This method eliminates any controversy over the existence of an input inflation differential. In addition, and as an essential part of its recommendation, GTE recommends that the PCI adjustment factor for a given year be an optimal forecast of the PCI change that would occur in that year, based on actual observed changes in the PCI in previous years.

The Commission's previous reasons for not using a direct measure are no longer valid; *i.e.*, (i) that an input inflation index for LECs did not exist; or (ii) that, if one existed, the LECs could manipulate it. The tentative conclusion by the Commission that it is appropriate to incorporate an input price differential into a TFP-based X-Factor demonstrates that the Commission is willing to employ an input inflation index for the LECs and is no longer so concerned with manipulation as to reject its use. Otherwise, the Commission would not be willing to employ a LEC input inflation index to calculate an input price differential.

Alternatively, GTE could support a formula that determines the change in the price cap index by subtracting the change in US TFP from the change in LEC TFP -- adjusted for exogenous costs. GTE could support this formula because of its ease of computation, as long as the Commission recognizes that it should not include an adjustment for deviations between economy-wide and LEC input price change series. This alternative formula is an approximation of the economically sound formula proposed by GTE and has the advantage of being more stable as it does not depend upon difficult-to-obtain input price data.

GTE cannot support a formula that contains an input price differential. GTE and USTA have both demonstrated, using various economic methods, that the addition of an input inflation differential to the GDPPI-based price cap formula is not economically sound. Further, to incorporate an input inflation differential into a PCI adjustment factor would cause pricing instability that would not be consistent with the functioning of a well-working competitive market. GTE submits that the controversy over this issue would be eliminated by replacing "GDPPI-X" in the price cap formula with the growth of LEC input prices minus the rate of LEC TFP growth.

TFP is the most appropriate measure of LEC productivity. GTE supported the original Christensen TFP study and supports the simplified method proposed by Christensen in the instant proceeding. Christensen's simplified model uses only publicly available and verifiable data as its sources, and thus can easily be updated annually. The simplified model negates the Commission's concern regarding the

availability of data sources for the Christensen TFP method. GTE urges the Commission to adopt Christensen's simplified model.

GTE does not support the calculation of a separate interstate TFP because it is not economically meaningful. A properly constructed productivity offset: (i) reflects the entire range of diverse factors that cause changes in the unit cost of production for the LECs; and (ii) measures changes in the overall efficiency of production. Partial measures of productivity -- which is what an interstate measurement would be -- are inconsistent with the economics of price caps because they are confined to particular inputs or outputs. Further, there is no economically meaningful method of separating production between inter- and intrastate unless the technology of the industry is separable between inter- and intrastate -- a condition that does not apply to telecommunications. The appropriate PCI should contain the effects of all inputs and outputs used by the firm. It should not be distorted by artificial jurisdictional separations that have no basis in production or significance in market terms. Separability requires that the production of the separable activities be most efficiently done independently. If efficient operation requires common facilities or shared resources -- which is a recognized characteristic of the telecommunications industry -- this is a conclusive sign that the activities are not separable. For these reasons, GTE opposes the use of an interstate-only TFP methodology.

Further, GTE does not support the inclusion of data for industry segments other than price cap LECs in the calculation of TFP. As a matter of precedent, as well as logic, price cap regulation establishes productivity factors based only on those firms

being regulated. Further, the inclusion of other industry segments would serve to distort the actual productivity of price cap LECs. This distortion could go either way; it could make the productivity factor higher or lower -- depending on the subset of other firms included in the analysis. The Commission should not waste its energies seeking to determine which other firms should be included. It should decide at the outset to measure only the productivity of those firms being regulated.

GTE opposes the addition of a Consumer Productivity Dividend ("CPD") to LEC productivity. There should be no CPD because: (i) the decision to add a CPD, and the value selected, were arbitrary; (ii) a mechanism to pass the first benefits of price caps is no longer needed; and (iii) adoption of a methodology that forecasts the next year or, in the alternative, a methodology that includes only years under price cap regulation obviates any perceived need to adjust for historical gains.

GTE submits that the inclusion of sharing diminishes the coherence and effectiveness of price caps to a point where it becomes indistinguishable from rate of return regulation modified by factors forcing prices downward. Further, in a well-functioning competitive market, the rate of output price changes would not contain a sharing term. Inclusion of a sharing term distorts the price cap mechanism and prevents it from emulating a competitive market. The record of this proceeding will provide ample evidence to substantiate the selection of a productivity factor that accurately predicts the LECs' productivity. The Commission no longer lacks experience with price caps, and no longer requires sharing as a "backstop" mechanism.

GTE submits that TFP is a direct measure of productivity where all inputs (labor, capital, materials) and all outputs (lines, minutes, *etc.*) are taken into account. This

means a separate formula for the common line basket is not required. Certain costs incurred by LECs will not be captured even with a direct measure of the change in LEC input prices and the change in LEC TFP. These costs should be afforded exogenous treatment. Until price cap LECs are allowed to operate in a fully competitive market where administrative, legislative or judicial actions do not uniquely affect them, they should be allowed to seek exogenous treatment for costs incurred as a result of these actions -- provided these costs are not accounted for in the PCI adjustment factor.

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GTE's COMMENTS

GTE Service Corporation and its affiliated domestic telephone operating companies ("GTE") hereby offer comments on the Commission's Fourth Further Notice of Proposed Rulemaking ("*Fourth Notice*"), FCC 95-406 (released September 27, 1995), in the proceeding captioned above with reference to the specifics of the price cap formula.

BACKGROUND

In the *Fourth Notice*, the Commission deals primarily with the long-term structure of the components of the price cap formula: the productivity measurement or X-Factor; the link between the X-Factor and sharing; the common line formula regarding the treatment of "g";¹ and exogenous cost treatment or the Z-Factor.² The price cap

¹ "g" is the growth in minutes-of-use per line.

² The initial LEC price cap formula was established in *Policy and Rules Concerning Rates for Dominant Carriers*, Second Report and Order, CC Docket No. 87-313, 5 FCC Rcd 6786 (1990), and Erratum, 5 FCC Rcd 7664 (1990) ("LEC Price Cap Order"), modified on recon., 6 FCC Rcd 2637 (1991) ("LEC Price Cap Reconsideration Order"), *aff'd sub nom. National Rural Telecom Ass'n v. FCC*, 988 F.2d 174 (D.C. Cir. 1993).

formula resets the Price Cap Index ("PCI")³ for each price cap basket annually based on the Gross Domestic Product Price Index ("GDPPI")⁴ less a productivity offset or X-Factor,⁵ and allows adjustments for exogenous costs or the Z-Factor.⁶ The Common Line basket receives slightly different treatment. In order to cap carrier common line rates, the Commission devised a formula known as the "Balanced 50/50 formula"⁷ which sets the PCI for the Common Line basket to "reflect expected LEC performance

³ LECs' interstate access services are segregated into baskets based on the type of service; *i.e.*, Interexchange, Common Line, Trunking, Traffic Sensitive, and Video Dialtone, with each basket having its own PCI. The original basket structure has been modified twice since the *LEC Price Cap Order*. See *Transport Rate Structure and Pricing*, Second Report and Order, CC Docket No. 91-213, 9 FCC Rcd 615 (1994); and *Price Cap Performance Review for Local Exchange Carriers; Treatment of Video Dialtone Services Under Price Cap Regulation*, Second Report and Order and Third Further Notice of Proposed Rulemaking, CC Docket No. 94-1 ("D.94-1"), FCC 95-394 (released September 21, 1995).

⁴ Initially, the Commission selected the Gross National Product Price Index ("GNPPI") as the appropriate measure of economy-wide inflation. *LEC Price Cap Order*, 5 FCC Rcd at 6792-93. The Commission changed this inflation index to the GDPPI in the *First Report and Order*. *Price Cap Performance Review for Local Exchange Carriers*, First Report and Order, 10 FCC Rcd 8961, 9115-9116 (1995) ("*First Report and Order*").

⁵ The X-Factor "reflects the fact that changes in unit costs in the telecommunications industry historically have been below the level of inflation." *Fourth Notice* at para. 13.

⁶ Exogenous costs are costs incurred by LECs caused by administrative, legislative, or judicial requirements beyond their control. *LEC Price Cap Order*, 5 FCC Rcd at 6807.

⁷ *Id.* at 6795.

in lowering loop costs and to share the benefits of the productivity gains associated with increased common line usage between LECs and their customers."⁸

In the *LEC Price Cap Order*, the Commission mandated an X-Factor of at least 3.3 percent. This X-Factor was based on the average of two studies, Spavins/Lande and Frentrup/Uretsky, which reflected a historical productivity growth of 2.8 percent.⁹ A 0.5 percent CPD was "added to assure that the first benefits of price caps flow to customers in the form of reduced rates."¹⁰

In response to the *First Notice*,¹¹ the Commission received various suggestions regarding the appropriate method of calculating the X-Factor. USTA and the price cap LECs proposed using the TFP method submitted by Laurits R. Christensen, Philip E. Schoech, and Mark E. Meitzen ("Christensen") and supported by National Economic Research Associates, Inc. ("NERA")¹² AT&T submitted a Direct Model, which the Commission refers to as the Historical Revenue Model,¹³ that bases the X-Factor on the rate of return earned by the RBOCs.

⁸ *First Report and Order*, 10 FCC Rcd at 9078.

⁹ *See LEC Price Cap Order*, 5 FCC Rcd at 6798.

¹⁰ *Id.* at 6799.

¹¹ *See D.94-1*, Notice of Proposed Rulemaking, 9 FCC Rcd 1687 (1994) ("*First Notice*").

¹² *See Fourth Notice* at para. 22.

¹³ *Id.* at para. 77.

In the *First Report and Order*, the Commission concluded that there "is an insufficient record to choose a long-term methodology for computing the X-Factor."¹⁴ Thus, using the original method with an update¹⁵ to the Frentrup/Uretsky study (now referred to as the Historical Price Method),¹⁶ the Commission concluded that the mandated X-Factor should have been 4.0 percent.¹⁷ Using this as a basis, the Commission established three X-Factor options: 4.0, 4.7, and 5.3 percent. The 4.0 and 4.7 percent options retained sharing. The 5.3 percent option relieves any LEC selecting this option from the sharing requirement.¹⁸

In addition, the Commission decided that the X-Factor "should be based on an industry-wide measure of performance, and it should incorporate productivity changes that have occurred since the institution of price cap regulation."¹⁹ Having decided this, the Commission reached the tentative conclusions that: the X-Factor should not be fixed but recalculated routinely and automatically as a moving average; a TFP methodology should be adopted; and the long-term plan should have at least two X-

¹⁴ *First Report and Order*, 10 FCC Rcd at 9026.

¹⁵ The 1984 data point was excluded from the Frentrup/Uretsky study. See *First Report and Order*, 10 FCC Rcd at 8970.

¹⁶ See *Fourth Notice* at para. 86.

¹⁷ See *First Report and Order* at 8970.

¹⁸ *Id.* at 8971.

¹⁹ *Id.* at 9026.

Factor options.²⁰ In the *Fourth Notice*, the Commission seeks to establish the long-term rules governing the X-Factor. Therefore, the Commission asks for comment on the appropriate methodology for calculating the X-Factor, the means of updating this factor, how many factors there should be, and the relationship of the X-Factor to sharing, the common line formula, and exogenous cost treatment.

Just as contentious as the X-Factor issue was the debate over the formula for the Common Line basket. The Commission, in the *First Report and Order*, tentatively concluded that LECs have little influence over growth in common line usage and that the formula should be changed to a per-line formula, rather than the current Balanced 50/50 formula.²¹ The Commission's position is that a per-line formula would recognize that loop costs are not traffic sensitive and would encourage Interexchange Carriers ("IXCs") to increase common line usage. In the *Fourth Notice*, the Commission readdresses the common line formula in relation to X-Factor methodologies in order to determine if any X-Factor methodologies eliminate the need for a separate common line formula.

The last major issue addressed in the *Fourth Notice* is exogenous cost treatment. The Commission changed the definition of exogenous costs in the *First Report and Order* to "economic cost changes caused by administrative, legislative, or judicial requirements beyond the control of the carriers that are not reflected in the

²⁰ *Id.* at 9027.

²¹ *Id.* at 9078-9079.

[GDPPPI]."²² Therefore, only accounting rule changes that affect a LEC's discounted cash flow can be claimed as exogenous costs. The Commission now seeks to establish the relationship between the proposed X-Factor methodologies and exogenous costs to determine if any particular methodology would include costs classified as exogenous and exclude those not classified as exogenous.

DISCUSSION

I. THE COMMISSION NOW HAS AVAILABLE A LEC INPUT INFLATION INDEX AND AN ACCURATE MEASURE OF LEC TFP.

The goal of price cap regulation is to mimic the behavior of output prices in a competitive market. This is best accomplished by utilizing a direct measure of changes in LEC unit cost and LEC TFP to cap LEC output price changes. This method eliminates all economy-wide data from the price cap formula and concentrates purely on the price cap LECs. Further, the use of direct measures eliminates the controversy over the input inflation differential.²³ The Commission's previous reasons for not using a direct method are no longer valid; *i.e.*, an input inflation index for LECs did not exist or that, if one did, the LECs could manipulate it.²⁴ The tentative conclusion by the Commission that "it is appropriate to incorporate an input price differential into a TFP-

²² *Id.* at 9090.

²³ The input inflation differential is the difference between economy-wide inflation and LEC inflation.

²⁴ See *LEC Price Cap Order*, 5 FCC Rcd at 6792-93.

based X-Factor²⁵ demonstrates that the Commission has an input inflation index for the LECs and is no longer concerned with manipulation.²⁶ Otherwise, an input inflation index for LECs could not be used to calculate an input price differential.

Moreover, as an approximation to competition, the current price cap formula ($GDPPI-X+/-Z$) is valid only if there is no differential between the US input price growth series and the LEC input price growth series. Unlike the situation that existed at the time of the earlier decision, a LEC input price growth series exists and is available. Christensen provided a time series of LEC input inflation as part of the TFP study placed on the record by USTA.²⁷ GTE submits that establishing a price cap formula based on LEC direct measurements is simpler, more accurate, and less controversial than the adoption of an X-Factor methodology that contains an input price differential.²⁸

GTE supports the TFP results submitted by Christensen in this proceeding²⁹ and further endorses those proposed changes that simplify the model and use publicly available and verifiable data.³⁰ TFP-based methods calculate a specific productivity

²⁵ *First Report and Order*, 10 FCC Rcd at 9033.

²⁶ GTE supports the use of the input price data in the Christensen study as it is methodologically consistent.

²⁷ This time series is listed in Appendix F of the *First Report and Order*.

²⁸ Further, as GTE will demonstrate *infra*, the statistical evidence indicates that the input price differential is a random variable whose mean over the long-run is zero. Any attempt to select a non-zero value for this differential would mis-specify the formula.

²⁹ See *Fourth Notice* at para. 23.

³⁰ See USTA's Comments in the instant proceeding, Attachment A.

growth factor that forces the industry output price index to behave as it would under competition. Thus, GTE concurs with the Commission's tentative conclusion that a "TFP approach should be used to calculate the X-Factor in the future."³¹

In summary: GTE recommends that the Commission adopt a price cap formula that consists of the growth of the LEC input price minus the rate of LEC TFP growth adjusted for exogenous costs. This eliminates all economy-wide data from the price cap formula. GTE also recommends the use of Christensen's simplified TFP model, which is the appropriate measurement of LEC productivity. GTE urges the Commission to adopt a price cap formula consisting of LEC-specific measurements only, and to further adopt Christensen's simplified TFP model as the appropriate measure of LEC TFP growth.

II. THE THEORETICALLY ACCURATE MEASURE OF THE PCI ADJUSTMENT IS THE GROWTH OF THE LEC INPUT PRICE MINUS THE RATE OF LEC TFP GROWTH. (Issue 1i)

A. A return to first principles -- a direct measure -- is called for given that a LEC input price index exists.

The growth of LEC input prices minus the rate of LEC TFP growth is the appropriate measure of the PCI adjustment factor (see Appendix A).³² As the Commission previously stated:

³¹ *Fourth Notice* at para. 25.

³² This is the formula used by the Interstate Commerce Commission ("ICC") for regulating the railroads -- changes in railroads' costs reflect changes in railroad productivity as well as changes in railroad input prices. See Interstate

[W]e believe it is important to clarify and refine what economic changes we seek to capture in the index we will select. While our Notice sought to identify an index that captured changes in the purchasing power of money, i.e., a general index of inflation, its purpose in identifying such an index was to capture inflationary changes that the carriers themselves face. Thus, the index we seek to adopt should capture changes in the purchasing power of money as a measure of the cost of factors of production. By selecting an index that will most closely mirror the inflationary pressures faced by carriers, our price cap formula will produce a result more equitable to both the carriers and ratepayers.³³

The Commission now has the ability to return to first principles -- an index that reflects the inflationary pressures faced by the LECs. Further, using a LEC-specific inflation index eliminates any perceived need for an input price differential -- long- or short-term -- which GTE firmly believes has no place in the price cap formula. As explained *supra*, the Commission's previous reasons for not using a direct measure are no longer valid. Given that an input inflation index exists, it is now correct to return to first principles and directly measure changes in LEC unit cost and LEC TFP to cap output price changes.

In competitive markets, a revenue-share-weighted average of industry output price growth ($\% \Delta P_{LEC}$) will equal a cost-share-weighted average of the industry input price growth ($\% \Delta W_{LEC}$) minus the rate of change of industry total factor productivity ($\% \Delta TFP_{LEC}$), plus or minus exogenous factors that would ordinarily effect changes in

Commerce Commission *Ex Parte* No. 290 (Sub-No.7) Productivity Adjustment-Implementation, decided October 26, 1993, at 1072.

³³ *Policy and Rules Concerning Rates for Dominant Carriers*, Further Notice of Proposed Rulemaking, CC Docket No. 87-313, 3 FCC Rcd 3195, 3389-90 (1988) ("*D.87-313 FNPRM*")

output prices, such as changes in accounting rules, taxes, etc. (the so-called exogenous or Z-Factor). The economically valid PCI adjustment factor is:

$$\% \Delta P_{LEC} = \% \Delta W_{LEC} - \% \Delta TFP_{LEC} + / - Z$$

where $\% \Delta P_{LEC}$ is the PCI adjustment factor, $\% \Delta W_{LEC}$ is the cost-share-weighted average of percentage input price changes and $\% \Delta TFP_{LEC}$ is the industry growth rate in percentages.

GTE could support the formula:

$$\% \Delta P_{LEC} = \% \Delta GDPPI - (\% \Delta TFP_{LEC} - \% \Delta TFP_{US}) + / - Z$$

because of its ease of computation. This support is contingent on the Commission recognizing that no adjustment for deviations between the US and LEC input price change series is necessary. (See Appendix B.) This formula is an approximation of the economically sound formula proposed by GTE, and has the advantages of being more stable and not requiring a LEC input price index.

GTE cannot support the formula:

$$\% \Delta P_{LEC} = \% \Delta GDPPI - (\% \Delta TFP_{LEC} - \% \Delta TFP_{US}) + W + / - Z$$

where W is an estimate of the difference between the US input price change series and the LEC input price change series. As shown in Appendix C, this last formula, if properly applied, reverts to the formula recommended by GTE.³⁴ If this formula is

³⁴ If the US and LEC TFP and input price series are not measured using the same method, this last formula would not produce the same result as the formula proposed by GTE. Different calculation methods employed for these series reinforces the need to simplify the formula.

improperly applied, it merely creates another area for dispute and could produce results that are not economically meaningful.

It is particularly important to realize that there is no evidence that W is anything but a random process bouncing around zero. A permanent fixed input price differential, other than zero, would not be economically valid as discussed *infra*. Further, as more components are added to the formula, it becomes increasingly subject to error and manipulation. If different time periods were assigned for averaging each of the components, the formula could result in significantly different results. For example, if GDPPI is set at an annual value and TFP is set at a five-year moving average while W is set at a three-year moving average -- just to obtain a specific desired result -- the formula loses its economic validity.

B. Economic analysis demonstrates that the input inflation differential is zero.

Both Christensen³⁵ and Duncan³⁶ have presented evidence that the input inflation differential should be zero in the price cap formula. NERA confirms these points: (i) the long-term trend is not significantly different from zero at conventional confidence levels;

³⁵ See *Ex Parte* Affidavit of Dr. Laurits R. Christensen on Behalf of the United States Telephone Association, D.94-1, dated February 1, 1995.

³⁶ See Appendix F, GTE California Incorporated Testimony and Reply Testimony of Dr. Gregory M. Duncan, California Public Utilities Commission NRF Reform Proceeding - I. 95-05-047, dated September 8 and 18, 1995, respectively. ("*Duncan*")

and (ii) it has not changed since the divestiture of the RBOCs.³⁷ Appendix F of the *First Report and Order* concludes that the input price differential from the 1984-1990 time period is not zero and should be used in calculating the X-Factor.³⁸ Appendix F is flawed by a complete misuse of statistical methodology which leads to an erroneous conclusion that there is a differential between the growth of LEC input prices and the economy-wide growth in input prices. Most egregious in that Appendix is the introduction of a dummy variable without theoretical support. The authors of Appendix F test the statistical significance of the variable and conclude there is evidence of a structural break in the series -- that is a permanent change in the relationship between the two input price series. They do this without sensitivity analysis; had they done so, they would have found their purported structural break is merely a statistical artifact. For example, moving the starting date of the dummy to 1983, when divestiture was ordered, eliminates their finding. Their errors arise from a misunderstanding of classical hypothesis testing, and a misapplication of indicator variable, or dummy variable, methodology.

Their first error was in determining the null hypothesis. The hypothesis that there is no difference between the series should have been the one to be tested because: (i) economic theory suggests that the two series move together; (ii) the Commission's reason for replacing the LEC input price growth index with the US input price growth

³⁷ See USTA's Comments in the instant proceeding, Attachment C.

³⁸ See *First Report and Order*, Appendix F at 13-14.

index was that the series should be the same; and (iii) numerous outside witnesses testified that the series are the same. The authors of Appendix F, instead, propose to test the hypothesis that there is a difference, but do not specify in advance what that difference is. They assume there is a difference, find an estimation technique that exhibits a difference, and then test the hypothesis that the data exhibit exactly that difference. This is called data mining, and it is unacceptable statistical methodology.

Duncan takes a time-series approach. He shows first that the series made up of differences between the two input price series is a stationary Autoregressive Moving Average ("ARMA") process. Stationarity implies that there is no structural break. He then goes on to show that the mean of the series, that is the estimated difference in the series, is zero. Finally, he shows that the difference in the series is totally random. This means that any observed differences between the series are totally transitory -- pure noise that should be ignored. In his reply testimony, Duncan employs the methodology of Appendix F, *arguendo*, to show that the same argument used by the authors of Appendix F can be used to give any W-Factor desired.

In fact, an examination of the data would show that the sign of the W-Factor changed again between 1990 and 1991. Since that time, LEC input prices have been growing faster than the input prices for the economy as a whole. If, using the methodology of Appendix F, a dummy variable were inserted after 1991, it also would indicate a structural break. Thus, the Appendix F methodology would dictate an even lower X-Factor than anyone in these proceedings has suggested. Duncan goes on to point out a number of other flaws in the methodology invented by the authors of

Appendix F, any one of which would be fatal.³⁹ GTE submits that a formula using direct measures would incorporate all available information concerning LEC input prices, without imposing any judgment as to whether a differential exists. This approach would eliminate the controversy over the input price differential.

C. Incorporating an input price differential is inconsistent with emulating competition and will cause unnecessary pricing instability.

Addition of an input price differential to a formula that is already an approximation is not consistent with either economic or statistical theory. Moreover, since the method is *ad hoc* and not based on methods of statistical or economic validity, it cannot be optimal. Indeed, not only may it show too much instability, it will most likely be biased.

Use of a differential formula which incorporates an input price differential could introduce instability in two ways. First, the differential formula requires the use of two additional variables, the $\% \Delta P_{US}$ and $\% \Delta TFP_{US}$. These are measured by using GDPPI and the Bureau of Labor Statistics ("BLS") TFP series, respectively. Any inconsistency between these national measures and LEC industry measures will introduce error and instability into the PCI estimate.

Second, any difference in the way these variables are introduced into the formula will also create error and instability. For example, if a fixed value is chosen for

³⁹

See Duncan.

the input price differential, while a five-year moving average is used for TFP, then the differential formula will no longer correspond to the direct measure.

In summary: An optimal forecast of the difference between the LEC input price growth index and the rate of LEC TFP growth is the appropriate measure of the PCI adjustment factor. To the extent the Commission now has available a LEC input inflation index and an accurate measure of LEC TFP, it should return to first principles and employ the proposed direct measure. To simply add an input inflation differential to the existing price cap formula adds unnecessary and unwarranted complications and is not supported by theory. Moreover, it flies in the face of the Commission's stated desire to reduce the complexity of the formula, not to further complicate it. Finally, GTE's recommendation is grounded firmly in economic and statistical methodology and theory, and as such is relatively safe from manipulation.

III. TFP SHOULD BE BASED ON CERTAIN CRITERIA.

A. The Christensen method is the most reasonable method to develop output price indexes for TFP calculation purposes. (Issue 1a)

The proper method for determining TFP changes appropriate for calculating the PCI is to use a revenue-share-weighted average of percentage output changes minus a cost-share-weighted average of percentage input changes. Categories of inputs can be aggregated up to the point where input price growth of the components to be aggregated begins to deviate substantially. That is, as long as the relative prices of two inputs, or a group of inputs, do not change -- as would be the case if their growth rates were roughly the same -- the inputs can be combined and no further disaggregation will

improve accuracy. Further, additional disaggregation would require burdensome data gathering and time-consuming computation.⁴⁰

B. The most appropriate measure of the cost of capital for a TFP study incorporates both debt and equity components. (Issue 1b)

Both debt and equity components should be included in a measure of the cost of capital. Christensen used Moody's Yield on Public Utility Bonds in the development of the TFP as it: (i) was publicly available data that was updated annually; and (ii) the absence of equity in Moody's had a negligible effect on measured TFP growth -- which was what Christensen was measuring. As suggested by Christensen, the US National Income and Products Accounts could be substituted for Moody's bond yield. This recommended change would treat LEC and economy-wide costs of capital symmetrically,⁴¹ and would be more consistent with an economically meaningful measure of the changes in the cost of capital when analyzing both TFP and input prices. Also, these data are readily available and publicly verifiable.

GTE does not support the Commission's authorized rate of return for use in a TFP study. The Commission's rate of return is not calculated annually and, because of the timing interval for represcription proceedings, could increase the volatility of the input price index. Further, represcription proceedings have no place in a price cap

⁴⁰ GTE supports the simplified model proposed by Christensen whereby all data can be obtained from publicly available and verifiable sources. See USTA's Comments in the instant proceeding, Attachment A.

environment. They perpetuate a link to rate of return regulation, as opposed to regulation by the competitive marketplace. If, as the Commission proposes, the new price cap plan does not include sharing, then the need for an authorized rate of return for price cap LECs would disappear. Adopting the Commission's authorized rate of return for use in a TFP study would be a step in the wrong direction.

C. Economic depreciation rates are the relevant rates for TFP. (Issue 1c)

The Commission's prescribed depreciation rates are not appropriate for a TFP study because they generally differ significantly from economic lives. Technological developments have made obsolete the depreciation lives prescribed by the Commission.⁴² Further, the bands established by the Commission for streamlined treatment also are not based on economic theory. Only economic depreciation rates have meaningful value in a TFP study. As the Commission notes (*Fourth Notice* at para. 37), the economic rates used by Christensen were taken from Jorgensen, a productivity expert who recently updated the rates for expected lifetimes of the Bureau of Economic Analysis ("BEA"). As the BEA updates its lifetimes -- which is done approximately every five years -- the results should be incorporated into new economic depreciation rates used to develop TFP.

⁴² See *Simplification of the Depreciation Process*, CC Docket No. 92-296, Report and Order, 8 FCC Rcd 8025 (1993).